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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
|-----------------|-------------|----------------------|---------------------|

09/204,222 12/03/98 ISHIWATA

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| EXAMINER |
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| KLIMOWICZ, W | |
|--------------|--------------|
| ART UNIT | PAPER NUMBER |

2754
DATE MAILED:
04/21/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/204,222

Applicant(s)

ISHIWATA ET AL.

Examiner

William J. Klimowicz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☒ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☒ Notice of References Cited (PTO-892)
- 15) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3-5.
- 17) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: _____.

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DETAILED ACTION

Drawings

Figures 10-12 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: designator 117 as found at page 9, lines 13-14 of the instant application. Correction is required.

Specification

The abstract of the disclosure is objected to because it is not of a single paragraph. Correction is required. See MPEP § 608.01(b).

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a **single paragraph** on a separate sheet within the range of 50 to 250 words. It is important that the abstract not exceed 250 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said" or "**comprising**" should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

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Claim Objections

Claim 1 is objected to because of the following informalities:

With regard to claim 1 (line 7), the word "fist" should be changed to the word --first--.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-12, 14, 16 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Dill et al (US 5,898,548).

As per claim 1, Dill et al (US 5,898,548) discloses a magneto-resistance effect type composite read comprising: a first magnetic shield (S1) and a second magnetic shield (S2) successively layered on a slider (20); a reproduction head including a magneto-resistance effect element (hereinafter, referred to as an MR element-(40)) arranged between said first and said second magnetic shields (S1, S2); and a recording head arranged adjacent to said reproduction head so as to use said second magnetic shield as a first magnetic pole film and having a second magnetic pole film opposing to said first magnetic pole via a magnetic gap (see FIG. 3 and COL. 5, lines 6-8); said MR element comprising: a center region including a ferromagnetic tunnel

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junction magneto-resistance effect film (hereinafter, referred to as a TMR film) (i.e., the MTJ 100) having: a first ferromagnetic layer (e.g., 118) and a second ferromagnetic layer (e.g. 132) for generating a magneto-resistance effect using said first and said second magnetic shields (S1, S2) as electrodes so that a current flows in a an almost vertical direction between said first and said second magnetic shields (S1, S2); and a tunnel barrier layer (120) provided between said first and said second ferromagnetic layer (118, 132); and an end region (including 150) arranged to sandwich said center region from both sides for applying a bias magnetic field to said center region.

As per claim 2, said TMR film (100) includes an undercoat layer (102 and/or 112 and/or 134), said first ferromagnetic layer (118), said tunnel barrier layer (120), said second ferromagnetic layer (132), and an antiferromagnetic layer (116) successively formed in this order (e.g., see also COL. 8, lines 11-18).

As per claim 3, said TMR film includes an undercoat layer, an antiferromagnetic layer, said first ferromagnetic layer, said tunnel barrier layer, said second ferromagnetic layer, and a non-magnetic conductive layer successively formed in this order (see description of claim 2 and FIG. 4a).

As per claims 4 and 5, said antiferromagnetic film is made from an alloy containing as a main content Mn-X, wherein X represents at least one element selected from a group consisting of Cr, Fe, Co, Ni, Tc, Ru, Rh, Pd, Re, Os, Ir, and Pt (e.g., see COL. 7, lines 60-61).

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As per claims 6 and 7, said undercoat layer contains as a main content at least one element selected from a group consisting of Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, and Si (e.g., see COL. 6, lines 61-62).

As per claims 8-10, said first and said second ferromagnetic layers are formed from Fe, Co, or Ni, or an alloy containing Fe, Co, or Ni (e.g., see COL. 7, lines 36-59).

As per claim 11, said magnetic shields are made from a soft magnetic alloy containing as a main content Fe, Co, or Ni (see COL. 8, lines 40-45).

As per claim 12, said magnetic shields are made from an amorphous soft magnetic alloy containing as a main content Co-M, wherein M represents at least one element selected from a group consisting of Ti, V, Cr, Fe, Ni, Cu, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, Si, and Al (e.g., see COL. 8, line 43).

As per claim 14, said magnetic shields are made from a soft magnetic alloy containing as a main content Fe-Si-Al (see COL. 8, line 44).

As per claim 16, an insulator is provided on a junction surface between said center region and said end region (e.g. see FIG. 4a).

As per claim 17, said end region includes a non-magnetic insulation film (160), a permanent magnet film (150), and a non-magnetic film (160) successively arranged in this order.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dill et al (US 5,898,548).

See the description of Dill et al (US 5,898,548) in the preceding paragraph, supra.

With regard to claim 13, Dill et al (US 5,898,548) does not expressly show wherein magnetic shields are made from a soft magnetic alloy containing as a main content T-A-B, wherein T represents at least one element selected from a group consisting of Fe, Co, and Ni; A represents at least one element selected from a group consisting of Ti, V, Cr, Cu, Zr, Nb, Mo, Ru, Rh, Pd, Hf, Ta, W, Re, Os, Ir, Pt, Si, and Al; and B represents at least one element selected from a group consisting of C, N, and O.

With regard to claim 15, Dill et al (US 5,898,548) does not expressly show an electrically connected area between said TMR film and said second magnetic shield is equal to or smaller than an area of said TMR film opposing to said second magnetic shield.

Official notice is taken that such shield compositions as per claim 13 and such shield to MR head construction as per claim 15 are notoriously old and well known in the art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the shield compositions as per claim 13 and shield to MR head construction as per claim 15 as is notoriously old and well known in the art. The rationale is as follows: one of ordinary skill in the art would have been motivated to provide the shield compositions as per claim 13 and shield to MR head construction as per claim 15 as is notoriously old and well

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known in the art in order to provide a conventional shield with a prescribed permeability, coercitivity, etc. and to further provide sufficient current flow through the TMR, a is well known, established and appreciated in the art.

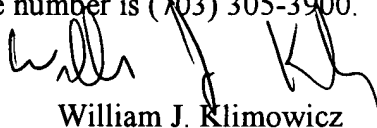
Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on M-F (6:30AM-5:00PM).

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-9051 for regular communications and (703) 308-9051 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.


William J. Klimowicz
Primary Examiner
Art Unit 2754

WJK
April 17, 2000